

CONTROL UNIT STRUCTURE FOR VEHICLE

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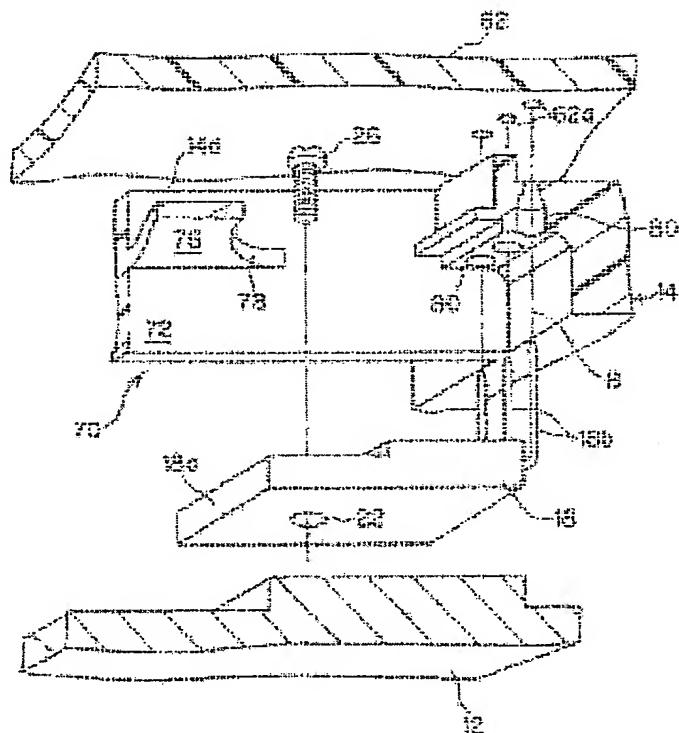
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Abstract of JP 2002320313 (A)

PROBLEM TO BE SOLVED: To enhance the efficiency of assembly work by facilitating the alignment of leads while securing heat radiative property, in case that a printed board for mounting and fixing a heat generating electronic part with its leads upward is stored in a control unit for a vehicle.

SOLUTION: A resinous case body (case body 14) for storing a board (a printed board 62) is mounted on a metallic base (base 12) which functions as a heat sink, with the heating part (power transistor 18) fixed. A recessed storage 70 capable of storing the heating part is made in the main body of the resinous case so as to store the heating part, also a lead passage hole 80 is bored in the wall face (power transistor contact face 76) of the recessed storage, and the lead 18 extended from the electronic part is passed.; Moreover, a second lead passage hole 62a leading to the lead passage hole is bored in the board and the lead is passed therein.



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CLAIMS**[Claim(s)]**

[Claim 1]A metal base where a heating component is fixed at least, and a case body made of resin pasted up on said metal base, In control unit structure for vehicles which is accommodated in an inside of said case body made of resin, comprises a substrate to which a lead extended from said heating component is connected, and is fixed in an engine room of vehicles, Control unit structure for vehicles constituting so that form a concave seat part in said case body made of resin, and said heating component is accommodated, and a lead insertion hole may be drilled in a wall surface which forms said concave seat part and said lead may be made to insert in said lead insertion hole.

[Claim 2]Control unit structure for vehicles given in claim 1 paragraph constituting so that the 2nd lead insertion hole that is open for free passage to said lead insertion hole may be drilled in said substrate and said 2nd lead insertion hole may be made to insert said lead in it.

[Translation done.]

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention]This invention relates to the control unit structure for vehicles.

[0002]

[Description of the Prior Art]Recently, move the locating position of the control unit for vehicles (henceforth a unit) arranged in the vehicle interior of a room of vehicles in the engine room of vehicles etc., shorten the harness to be used, and a cost cut is aimed at, and decreasing the noise given to other electronic autoparts is performed.

[0003]Since the inside of an engine room serves as an elevated temperature and a humid atmosphere as compared with the vehicle interior of a room, when the unit arranged there needs to maintain high waterproofness and it accommodates febrile electronic parts (heating component) in the inside, it needs to radiate heat promptly. The art which radiates heat from the intention by attaching directly the electronic parts which have a lead to the case made from aluminum where heat dissipation nature is high, etc. so that it may be indicated by the JP,4-1324992,A gazette, for example is proposed.

[0004]

[Problem(s) to be Solved by the Invention]When accommodating in the state where the lead of the electronic parts which carry a pudding and a substrate in the case made from aluminum was turned upward if it was in this conventional technology, The lead insertion holes of a major diameter are formed successively to the printed circuit board at the lead connection hole that the technical problem that workability gets worse should be solved by the variation in lead foaming of electronic parts, a mounting angle, and an attaching position, etc.

[0005]However, since the lead insertion holes of a major diameter were formed successively to the printed circuit board at the lead connection hole if it is in this conventional technology, there was a possibility of the packaging density of a printed circuit board not only falling, but solder having fallen out from an insertion hole and waking up soldering defects when soldering. In order to abolish these soldering defects, when the quantity of solder was made to increase, there was a possibility that the pitch between insertion holes might become small and between insertion holes or between leads might connect too hastily.

[0006]Therefore, even if this invention is a case where a printed circuit board in which it fixes upward and the lead of febrile electronic parts is carried in the control unit for vehicles is accommodated, It aims at providing the control unit structure for vehicles makes alignment of a lead easy and it was made to raise attachment workability, securing heat dissipation nature.

[0007]

[Means for Solving the Problem]In [in order to solve an aforementioned problem] an invention given in claim 1 paragraph, A metal base where a heating component is fixed at least, and a case body made of resin pasted up on said metal base, In control unit structure for vehicles which is accommodated in an inside of said case body made of resin, comprises a substrate to which a lead extended from said heating component is connected, and is fixed in an engine room of vehicles, Formed a concave seat part in said case body made of resin, and said heating component was accommodated, and a lead insertion hole was drilled in a wall surface which forms said concave seat part, and it constituted so that said lead might be made to insert in said lead insertion hole.

[0008]Form and accommodate a concave seat part which can accommodate a heating component in a case body pasted up on a metal base where a heating component is fixed (it functions as a heat sink), and. A lead insertion hole on a wall surface which forms this concave seat part on drilling and a twist concrete target. Since it constituted so that a lead insertion hole might be drilled by position which a lead extended from electronic parts inserts in when electronic parts were accommodated in a concave seat part, Attachment workability can be raised as easy in alignment of a lead, securing heat dissipation nature, even if it is a case where a printed circuit board in which it fixes upward and a lead of febrile electronic

parts is carried is accommodated. Since a concave seat part was provided, there is no influence of height of a unit increasing etc.

[0009]In claim 2 paragraph, it constituted so that the 2nd lead insertion hole that is open for free passage to said lead insertion hole might be drilled in said substrate and it might be made to insert said lead in said 2nd lead insertion hole further.

[0010]On a twist concrete target which drills in a substrate the 2nd lead insertion hole that is open for free passage to a lead insertion hole, and makes a lead insert in the 2nd lead insertion hole. Since it constituted so that a lead insertion hole and the 2nd lead insertion hole might be drilled by position which a lead inserts in when electronic parts were accommodated in a concave seat part, when attaching a unit, alignment of a lead can be made still easier and efficiency of attachment work can be raised further.

[0011]

[Embodiment of the Invention]Hereafter, the control unit structure for vehicles which starts one embodiment of this invention with reference to an accompanying drawing is explained. The control unit structure for vehicles concerning this embodiment is more specifically fixed on the inlet pipe of a room wall surface or an engine, etc. in the engine room of the vehicles which are not illustrated.

[0012]A plan for drawing 1 to explain the structure of the control unit 10 for vehicles concerning one embodiment of this invention (henceforth a "unit") and drawing 2 are the II-II line sectional views of drawing 1.

[0013]The unit 10 comprises a case body made of resin, metal colors by which a mold is carried out to the case body made of resin, and a metal base which have a bolt insertion hole and where a heating component is arranged. It is formed in rugged form, and the peripheral face in contact with the case body made of resin of metal colors is formed so that it may project in a bolt insert direction from the case body made of resin. Furthermore, the case body made of resin is attached to a metal base via adhesives, and metal colors and a metal base are co-fastened with a bolt, and it is fixed in one.

[0014]If the unit 10 is outlined, will become the base (metal base) 12 which consists of a high metallic material of heat dissipation nature, such as aluminum, and functions as a heat sink from a resin material, and the opening of the upper and lower ends will be carried out, and. The lower end 14a consists of the case (case made of resin) 14 with which it is equipped on the base 12, and a resin material, and it has the covering 16 (it is a graphic display abbreviation at drawing 1) formed so that the periphery of an end (after-mentioned) might be accommodated in the slot (after-mentioned) formed in the circumference of the upper bed 14b of the case body 14 and it might paste up.

[0015]As shown in drawing 2, the base 12 is formed in profile plate-like, and the heating component holding part 20 of a side view approximately trapezoidal shape is formed in febrile electronic parts and the position which the power transistor (heating component) 18 specifically contacts.

[0016]The four boltholes 24 (two pieces are illustrated) are drilled in the heating component holding part 20 by the position corresponding to the power transistor fixation hole 22 drilled by the power transistor 18, and a total of four power transistors 18 are attached in it by inserting the bolt 26 in the bolthole 24.

[0017]The base side bolt insertion hole 28 in which the bolt (after-mentioned) which fixes the unit 10 is inserted under the color mentioned later is drilled, and the rib-like heights 30' are formed in heights and a concrete target over the perimeter around it. The composition of the heights 30 is mentioned later. In the "upper part", in this specification, a lower part means down that (namely, the base 12 side) for above (namely, the covering 16 side) to the case body 14 in drawing 2.

[0018]The case body 14 presents the shape of a top-surface-view abbreviation hexagon, and the building envelope presents approximately rectangular shape, and it comes to carry out molding of it from resin materials, such as PBT (polybutylene terephthalate).

[0019]In the outside near [where the approximately rectangle of the case body 14 counters the center of two sides, it becomes a way from the metallic material which presents approximate circle tubed, and the resin molding of the color 32 which has the color side bolt insertion hole 31 is carried out to the case body 14 in one. The bolt insertion holes 28 and 31 are drilled by the position arranged so that the bolt mentioned later could open them for free passage.

[0020]Drawing 3 is a side view of the color 32. The peripheral face where the color 32 contacts the case body 14 is formed in rugged form so that it may be well shown in the figure. As the color 32 more specifically shows drawing 3 beforehand the proper position near the middle of a lengthwise direction (bolt insert direction) in the peripheral face in contact with the case body 14, the slip off stop crevice 34 is established in a transverse direction, and a common knurl process is performed to a lengthwise direction (bolt insert direction).

[0021]When vibration is added to the unit 10 after concluding with a bolt by having formed the slip off stop crevice 34 in the peripheral face of the color 32, or even if it is a case where the temperature change arose around, and each member

expanded or contracts to it, the color 32 escapes from the case body 14, and it does not come out of it. Since the common knurl was given to the peripheral face of the color 32, the color 32 does not race inside the case body 14.

[0022]If it was in this embodiment, performed the common knurl process to the peripheral face of the color 32, and formed the slip off stop crevice 34, but. Without forming the slip off stop crevice 34, for example besides this, if a twill line knurl process etc. are performed to the peripheral face of the color 32, the color 32 can be prevented from racing within the case body 14, and it can prevent shifting from the case body 14 to a bolt insert direction.

[0023]Drawing 4 is a surrounding partial expanded sectional view of the color 32 of drawing 2.

[0024]As shown in the figure, a resin molding is carried out so that it may project about 0.2-0.5 mm, for example, the lower end 32a of the color 32 carries out direct contact to the base 12, and the color 32 comprises the lower end 14a and the upper bed 14b of the case body 14 so that the upper bed 32b may carry out direct contact to the bolt 98. By it, at the time of attachment of the unit 10, it can attach only by metal members and the thermal shock resistance and attachment intensity of a conclusion portion in an engine room can be secured especially.

[0025]The wall section 14c formed in the shape of a skirt board is formed in the circumference of the lower end 14a of the case body 14. This becomes difficult to touch the adhesives 40 between the case body 14 and the base 12 with fats and oils, waterdrop, dust, etc., and adhesion reliability can be improved further.

[0026]If it is in the unit 10, a crevice is established in one side of the case body 14 and the base 12, and the heights which have a predetermined gap in the position corresponding to a crevice, and should be inserted in a crevice are formed in the another side. Hereafter, with reference to drawing 5, those composition is explained concretely.

[0027]Drawing 5 is a partial expanded sectional view expanding and showing the portion shown with the numerals A in drawing 2. As shown in the figure, the crevice 36 is established in the proper part (after-mentioned) of the lower end 14a of the case body 14 bottom face view annular. The heights 30 formed in the shape of a profile rib over the perimeter so that it might correspond to it are formed in the base 12. The heights 30 are inserted in the crevice 36, the color 32 having the length 38 projected from the lower end 14a of the case body 14, i.e., an about 0.2-0.5-mm gap.

[0028]The adhesives 40 applied to the crevice 36 (pouring) are extruded in the direction (longitudinal direction) of lower end 14a by inserting the heights 30 in the crevice 36 at the time of attachment of the unit 10.

[0029]When providing and attaching a predetermined gap between the case body 14 and the base 12 in the case of attachment of the unit 10, a gap may not fully be filled up with the adhesives 40, but waterproofness (sealing nature) and adhesive strength may be spoiled.

[0030]However, since it is inserted in the crevice 36 where the adhesives 40 are applied, the heights 30 having the predetermined gap 38 when attaching the base 12 to the case body 14 if it is in this embodiment, The adhesives 40 extruded from the crevice 36 can be extended in the gap 38, and it fully fills up with them there. Therefore, waterproofness (sealing nature) is securable, and adhesion area can be increased and adhesive strength can be raised. An adhesives avoidance part (after-mentioned) is provided so that the adhesives 40 may not reach the position which the base 12 and the color 32 contact.

[0031]The color 32 and the base 12 are co-fastened with the bolt 98 via the bolt insertion holes 28 and 31 drilled so that they might be opened for free passage, and, therefore, the unit 10 is fixed in one.

[0032]Although drawing 6 is the bottom view which looked at the case body 14 from the lower part, the crevice 36 is formed over the perimeter of the lower end 14a of the case body 14, as described above, so that it may be well shown in the figure. Although a graphic display is omitted, the heights 30 are formed in the base 12 over the perimeter so that it may correspond to it.

[0033]If it is in the unit 10, in order to improve waterproofness further, a connector joint mouth and a terminal are formed in the case body 14 in one, and the ventilating hole which makes a connector joint mouth open the inside of the case body (product made of resin) 12 for free passage outside is formed. Hereafter, with reference to drawing 7 etc., those composition is explained concretely.

[0034]Drawing 7 is a VII -VII line sectional view of drawing 1. As shown in drawing 1, drawing 6, and drawing 7, resin molding shaping of the connector joint part 50 is carried out in one at the case body 14. The opening of the end is carried out, and the connector joint mouth 52 is formed, and the connector joint part 50. Resin molding shaping of the terminal 56 for connecting the printed circuit board (after-mentioned) and the connector (a fictitious outline shows) 54 which are accommodated in the unit 10 is carried out in one with the case body 14 so that it may project in the inner direction of the connector joint mouth 52.

[0035]Drawing 8 is the side view which looked at the unit 10 shown in drawing 1 from the opening side of the connector joint mouth 52. As shown in drawing 7 and drawing 8, the ventilating hole 58 which makes the inside of the case body 14, exterior, i.e., seat part, and connector joint mouth 52 side open for free passage is formed in the connector joint

mouth 52.

[0036]The case side opening 58a is formed down the part where resin molding shaping of the terminal 56 was more specifically carried out in one in the case body 14, and the connector side opening 58b is formed in the wall surface position of the deepest part of the connector joint mouth 52, and the ventilating hole 58 is formed by their being opened for free passage.

[0037]When the air of unit 10 inside expands, the air of unit 10 inside more specifically flows in the connector joint part 50 through the ventilating hole 58. It can pass along the inside of harness (not shown) furthermore connected to the connector 54, and can escape at the places with comparatively sufficient environment in a vehicle room (not shown) etc. When the air of unit 10 inside contracts, air, such as the vehicle interior of a room, follows the reverse course at the time of expansion, and flows into the unit 10. Therefore, under the environment where the surrounding temperature change is remarkable, even if the unit 10 is a sealing nature high structure, the influence is not received. Also when attaching the covering 16 to the case body 14 via thermosetting adhesive, unit 10 inside and the exterior can be opened for free passage and ventilated.

[0038]The connector 54 is connected to the connector joint part 50 removable by the proper stopping mechanism (not shown) which the height 60 (shown in drawing 1, drawing 6, and drawing 8) for [of the wall surface of the connector joint part 50] stopping the connector 54 in a part suitably was formed, and was provided in the connector 54 side.

[0039]As shown in drawing 1, the upper bed 14b of the case body 14 is formed in profile flatness, and the power transistor seat part (after-mentioned) which can accommodate the power transistor 18 is formed in the inner direction by the side of the lower end 14a.

[0040]The printed circuit board 62 in which various kinds of electronic parts were carried is accommodated in the inside of the unit 10. The lead 18b of the power transistor 18 is connected to the printed circuit board 62. Harness (not shown) is stopped by the printed circuit board 62 via the connector 54, and transfer of an external configuration and a signal is performed. About those connection, since it is not related to the gist of this invention, explanation is omitted.

[0041]Hereafter, assembly of the unit 10 is explained with reference to drawing 9 etc. Drawing 9 is a perspective view explaining the partial process at which the power transistor 18 is accommodated in the case body 14 showing selectively the unit 10 shown in drawing 1.

[0042]The power transistor 18 is first accommodated in the case body 14.

[0043]In the case body 14, the four power transistor seat parts (concave seat part) 70 of it and the approximately said size are formed in the position in which the power transistor 18 is attached (one piece is illustrated).

[0044]The case body 14 turns the power transistor seat part 70 caudad, and it is formed in profile bathtub form. The power transistor contact surface 76 which is a part of wall surface of the power transistor seat part 70, It is used for passing the bolt 26 and the tool (driver) which is not illustrated, when it consists of semicircular state notching and a clipping of a rectangle, it has the communicating part 78 which opens the upper and lower sides of the case body 14 for free passage and the bolt stop of the power transistor 18 is carried out to the base 12.

[0045]A part of power transistor contact surface 76 is formed in the shape of a stage, and the three lead insertion holes 80 which can insert the lead 18b of the power transistor 18 are drilled there for every power transistor seat part. The substrate holding part 14d (shown in drawing 2, drawing 7, and drawing 9) which can lay the printed circuit board 62 is formed in the case body 14.

[0046]The lead insertion hole 80 is drilled by the position in which the lead 18b extended from the power transistor 18 is inserted when the main part 18a of the power transistor 18 is accommodated in the power transistor seat part 70.

[0047]Then, the relative position of the base 12, the case body 14, the power transistor 18, and the printed circuit board 62, etc. are explained.

[0048]The base 12 where the power transistor (heating component) 18 is fixed at least if it is in the unit 10 (metal), It is accommodated in case body [which is pasted up on the base 12 (product made of resin) 14, and case body 14 inside, Comprise the printed circuit board (substrate) 62 to which the lead 18b extended from the power transistor 18 is connected, the power transistor seat part 70 is formed in the case body 14, and the power transistor 18 is accommodated, and. The lead insertion hole 80 is drilled by the wall surface (power transistor contact surface) 76 which forms the power transistor seat part 70, and it is constituted so that the lead 18b may be inserted in the lead insertion hole 80.

[0049]That is, in the unit 10, the base 12, the case body 14, and the printed circuit board 62 make three layers, and are arranged. More specifically the printed circuit board 62 is arranged centering on the case body 14 in the upper part, the base 12 where the power transistor 18 was fixed caudad is arranged, and it is attached in the shape of three layer. Since the power transistor seat part 70 is formed in a concave, there is no influence of the height of the unit 10 increasing etc.

[0050]The power transistor 18 is first accommodated in the case body 14, and, subsequently the adhesives 40 are applied

to the proper position of the lower end 14a of the case body 14, and a concrete target over the perimeter in the crevice 36 of the case body 14 (pouring). The silicon system adhesives which can absorb expansion and contraction are used as the adhesives 40.

[0051] Subsequently, the case body 14 (lower end 14a) is attached on the base 12. Specifically, the heights 30 provided in the base 12 are inserted in so that it may be inserted in the crevice 36 formed in the case body 14.

[0052] If the heights 30 are inserted, the adhesives 40 applied to the crevice 36 (pouring) will be extruded by the internal direction of the case body 14, and the outer direction, i.e., the longitudinal direction in drawing 5, and will carry out quantity extension suitably, and the gap 38 will be filled up with them, as described above. In order to take the thickness 38 of the adhesives 40 required in more detail in order to secure the adhesive strength of the case body 14 and the base 12, i.e., a gap, a mold is carried out so that the color 32 may project by proper length from the lower part of the case body 14. Therefore, the gap 38 is filled up with the adhesives 40 and adhesive strength improves.

[0053] As shown in drawing 4, in the case body 14, the circumference of a lower end of a portion where the mold of the color 32 by which the mold was carried out was carried out is formed in the shape of a stage, and the adhesives avoidance part 84 is formed. The adhesives avoidance part 84 prevents the adhesives 40 from reaching to the lower end 32a position of the color 32 effectively.

[0054] When the base 12 is attached to the case body 14, the color 32 projected from two places serves as a fulcrum, the base 12 moves up and down selectively, and there is a possibility that it cannot attach with sufficient accuracy. Therefore, as shown in drawing 6, the four base placing parts 86 are formed in the proper position of the lower end 14a of the case body 12.

[0055] The base placing part 86 consists of the lobe 86a and the slot 86b, and the lobe 86a, in height (specifically the insert direction length of the bolt insertion holes 28 and 31), it is formed so that only the quantity (0.2-0.5 mm) and the said grade which the lower end 32a of the color 32 projected from the lower end 14a of the case body 14 may project. The slot 86b is formed in the same shape as the adhesives avoidance part 84 provided on the outskirts of a lower end of the color 32, and the adhesives 40 are prevented from reaching under the lobe 86a similarly.

[0056] As shown in drawing 6, the slot 86b is not formed to the wall section 14c. This is because it becomes easy to produce a deficit (what is called a short circuit) when a comparatively big closing-in part will be formed and resin molding shaping is performed when it is designed so that the slot 86b may touch the wall section 14c.

[0057] Subsequently, the bolt for the temporary stops of the unit 10 (not shown) is inserted in the bolt insertion holes 28 and 31 of the color 32 and the base 12, and the color 32 (namely, case body 14) and the base 12 are co-fastened using a nut (not shown).

[0058] In the state, adhesion with the base 12 and the case body 14 is completed by hardening the adhesives 40.

[0059] Subsequently, the bolt 26 is inserted in the power transistor fixation hole 22 thru or the bolthole 24 (it is a graphic display abbreviation at drawing 8) via the communicating part 78, and the bolt stop of the power transistor 18 is carried out to the base 12.

[0060] After the base 12 is fixed to the case body 14 (bolt stop), the printed circuit board 62 is inserted from the opening formed in the upper bed 14b side of the case body 14. The inserted printed circuit board 62 is dropped along with the substrate guide rib 88 by the side of the wall 82 (shown in drawing 1 and drawing 2) of the case body 14 suitably provided in the part, and two or more. By being pressed and pushed in from the upper part, it is dropped until it contacts the substrate holding part 14d of the case body 14, extending the board fixing means 90 (shown in drawing 1 and drawing 2) formed in the shape of *****. When the printed circuit board 62 contacts the substrate holding part 14d, the board fixing means 90 returns to the original shape, and, therefore, the printed circuit board 62 is fixed.

[0061] If it was in the unit 10, the 2nd lead insertion hole 62a (drawing 9) that is open for free passage to the lead insertion hole 80 is further drilled in the printed circuit board 62, and it was made to make the lead 18b insert in the 2nd lead insertion hole 62a.

[0062] The lead insertion hole (2nd lead insertion hole) 62a drilled by the substrate 62 more specifically, When the main part 18a of the power transistor 18 is accommodated in the power transistor seat part 70 and the printed circuit board 62 is fixed on the substrate holding part 14d, the lead 18b is drilled by the position (dashed-line B shows to drawing 9) which inserts in the lead insertion hole 62a and the lead insertion hole 80.

[0063] In other words, the lead 18b projected from the case body 14 is guided so that both the lead insertion holes 62a drilled by the printed circuit board 62 may be inserted in. Therefore, the alignment of the lead 18b and the lead insertion hole 62a becomes easy.

[0064] When attaching to the case (unit) where the substrate carrying the electronic parts which have a lead is accommodated, conventionally, in order to perform alignment at the time of connecting a lead to a substrate, the jig

needed to be used, or alignment needed to be performed manually and working efficiency was falling.

[0065]If it is in this embodiment, the case body 14 is constituted so that the lead 18b may be inserted in the lead insertion hole 80, when it has the power transistor seat part 70 of shape which imitated the shape of the power transistor 18 and the main part 18a of a power transistor is accommodated there. Since the alignment of the lead 18b is completed by this only by accommodating the power transistor 18 in the power transistor seat part 70, the working efficiency at the time of attaching the unit 10 can be improved.

[0066]Subsequently, the lead 18b and the printed circuit board 62 are connected by processing of soldering etc., and the covering 16 (shown in drawing 2 and drawing 6) is attached from the upper part. As the periphery 16a of an end of the covering 16 is shown in the figure, it is formed so that it may hang and the portion which hung is accommodated in the covering accommodation slot 94 formed over the perimeter of the upper bed 14b of the case body 14.

[0067]Subsequently, the silicon system adhesives 96 are applied to the portion (gap) of the emainer of the accommodated periphery 16a of an end, and the covering accommodation slot 94 (pouring), and the covering 16 is pressed by the weight etc. which are not illustrated from the upper part, and the adhesives 96 are hardened by heating the circumference.

[0068]The bolt and nut for trial fitting attachment in the attached unit 10 are removed, It is fixed to the unit placing parts 100 (shown in drawing 4) which become an inlet pipe of the proper part in the engine room of vehicles, for example, a room wall surface, and an engine, etc. from a metallic member via direct or stay via the securing bolt 98 in one, and the connector 54 is connected. At the above process, after carrying out the bolt stop of the power transistor 18 to the base 12 beforehand, the base 12 may be pasted up with the case body 14.

[0069]To the case body 14 pasted up as mentioned above on the base 12 where the power transistor 18 is fixed if it is in this embodiment of the invention. Form the concave power transistor seat part 70 which can accommodate the power transistor 18, and accommodate it, and. The lead insertion hole 80 is drilled in the power transistor contact surface 76 which forms the power transistor seat part 70, On the twist concrete target which makes it insert in the lead insertion hole 80, the lead 18b extended from the power transistor 18. Since it constituted so that the lead insertion hole 80 might be drilled by the position which the lead 18b inserts in when the power transistor 18 was accommodated in the power transistor seat part 70, Even if it is a case where the printed circuit board 62 in which it fixes upward and the lead 18b of the power transistor 18 is carried is accommodated, alignment of the lead 18b can be made easy and attachment workability can be raised.

[0070]On the twist concrete target which drills the 2nd lead insertion hole 62a that is open for free passage to the lead insertion hole 80 in the printed circuit board 62, and makes the lead 18b insert in it there. Since it constituted so that the lead insertion hole 80 and the 2nd lead insertion hole 62a might be drilled by the position which the lead 18b inserts in when the power transistor 18 was accommodated in the concave seat part 80, When attaching the unit 10, alignment of the lead 18b can be made easy and the efficiency of assembly operation can be raised further. Since the power transistor seat part 70 is formed in a concave, there is no influence of the height of the unit 10 increasing etc.

[0071]In [as described above] this embodiment of the invention, The metal base (base 12) which a heating component (power transistor 18) is fixed at least, and functions as a heat sink, The case body made of resin (case body 14) pasted up on said metal base, In the control unit (unit 10) structure for vehicles which is accommodated in the inside of said case body made of resin, comprises a substrate (printed circuit board 62) to which the lead 18b extended from said heating component is connected, and is fixed in the engine room of vehicles, Form a concave seat part (power transistor seat part 70) in said case body made of resin, and accommodate said heating component, and. The lead insertion hole 80 was drilled in the wall surface (power transistor contact surface 76) which forms said concave seat part, and it constituted so that said lead might be made to insert in said lead insertion hole.

[0072]The 2nd lead insertion hole 62a that is open for free passage to said lead insertion hole was drilled in said substrate, and it constituted so that said lead might be made to insert in said 2nd lead insertion hole.

[0073]In the above-mentioned embodiment, although the number of the febrile parts 18 accommodated in the unit 10, i.e., a power transistor, and the power transistor seat part 70 was made into four pieces, respectively, it is not restricted to it and is good as for other proper number.

[0074]Although the base 12 was used as the metallic material which consists of aluminum, as long as heat dissipation nature is high, other metallic materials may be chosen.

[0075]The case body 14 established the crevice in the peripheral face in contact with the color 32 in the transverse direction, and constituted so that a common knurl process might be performed, but. As long as the shape of the color 32 does not drop out of the case body 14 and it does not race performing a twill line knurl process etc. within the case body 14, it may be what kind of shape.

[0076]Although the heights 30 were formed in the base 12 side and the crevice 36 was formed in the case body 14 side, it may constitute so that the heights 30 may be formed in the case body 14 side and the crevice 36 may be formed in the base 12 side.

[0077]When the unit 10 attached, after accommodating the power transistor 18, adhesives were applied to the case body 14, but adhesives may be applied first.

[0078]

[Effect of the Invention]If it is in claim 1 paragraph, form and accommodate the concave seat part which can accommodate a heating component in the case body pasted up on the metal base where a heating component is fixed (it functions as a heat sink), and. A lead insertion hole on the wall surface which forms this concave seat part on drilling and a twist concrete target. Since it constituted so that a lead insertion hole might be drilled by the position which the lead extended from electronic parts inserts in when electronic parts were accommodated in a concave seat part, Securing heat dissipation nature, even if it is a case where the printed circuit board in which it fixes upward and the lead of febrile electronic parts is carried is accommodated, alignment of a lead can be made easy and attachment workability can be raised. Since the concave seat part was provided, there is no influence of the height of a unit increasing etc.

[0079]On the twist concrete target which drills the 2nd lead insertion hole that is open for free passage to a substrate in a lead insertion hole in claim 2 paragraph, and makes a lead insert in the 2nd lead insertion hole. Since it constituted so that a lead insertion hole and the 2nd lead insertion hole might be drilled by the position which a lead inserts in when electronic parts were accommodated in a concave seat part, when attaching a unit, alignment of a lead can be made still easier and the efficiency of attachment work can be raised further.

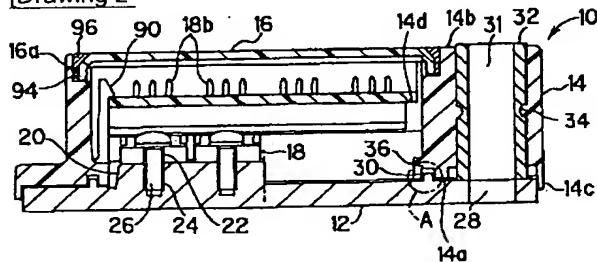
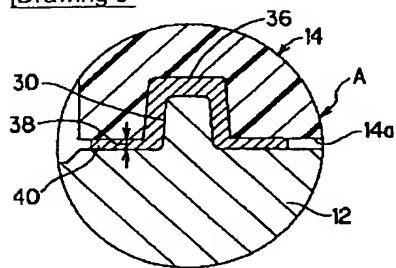
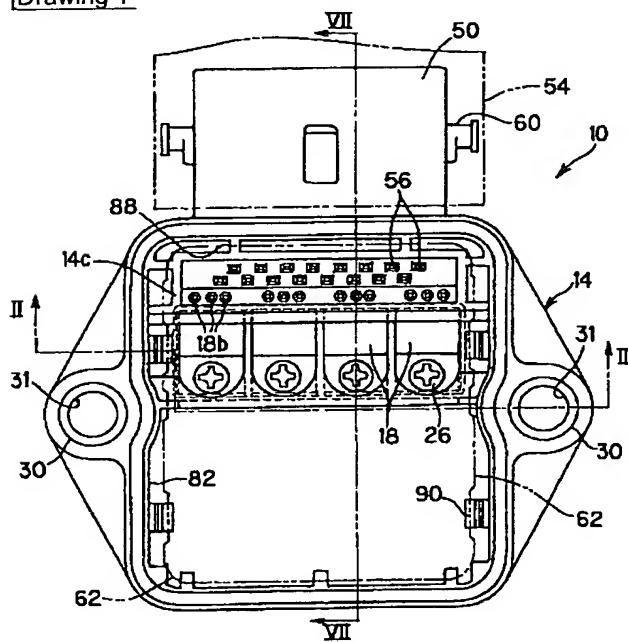
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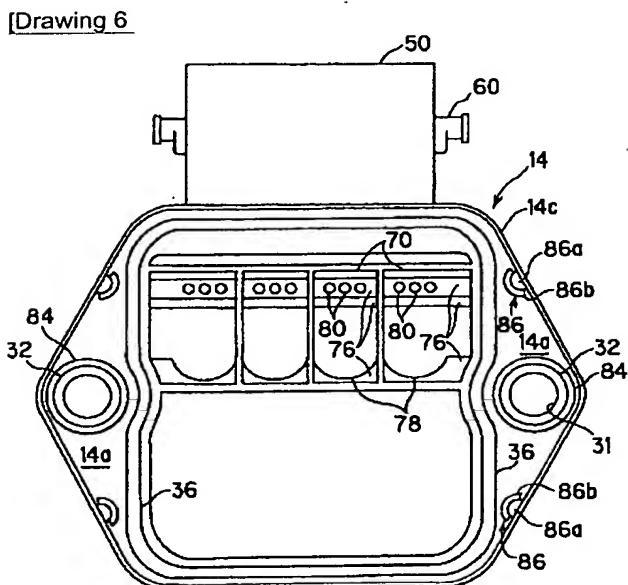
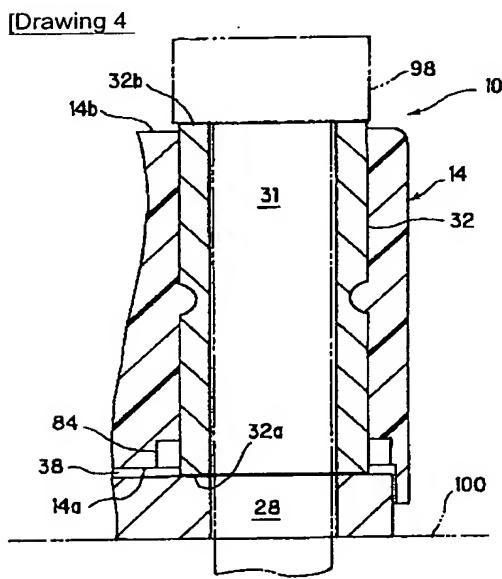
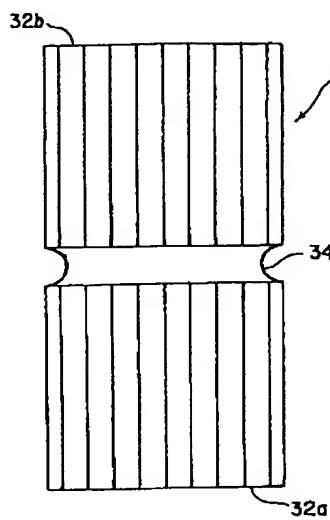
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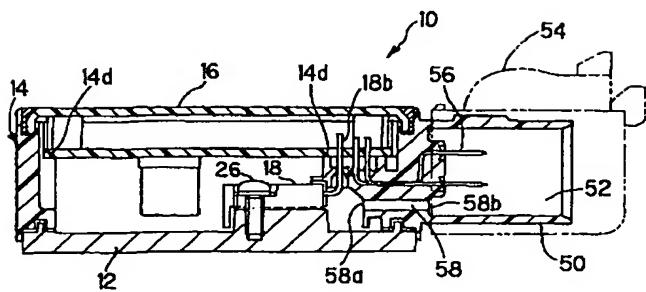
1. This document has been translated by computer. So the translation may not reflect the original precisely.
2. **** shows the word which can not be translated.
3. In the drawings, any words are not translated.

DRAWINGS

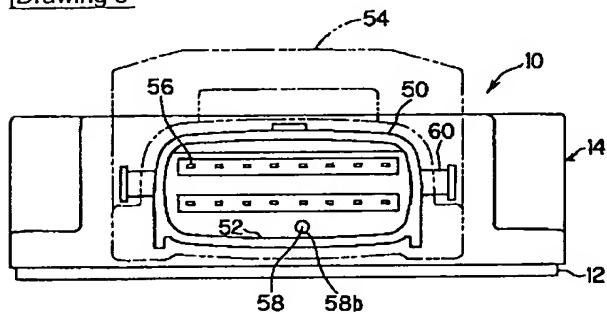
[Drawing 2]**[Drawing 5]****[Drawing 1]****[Drawing 3]**



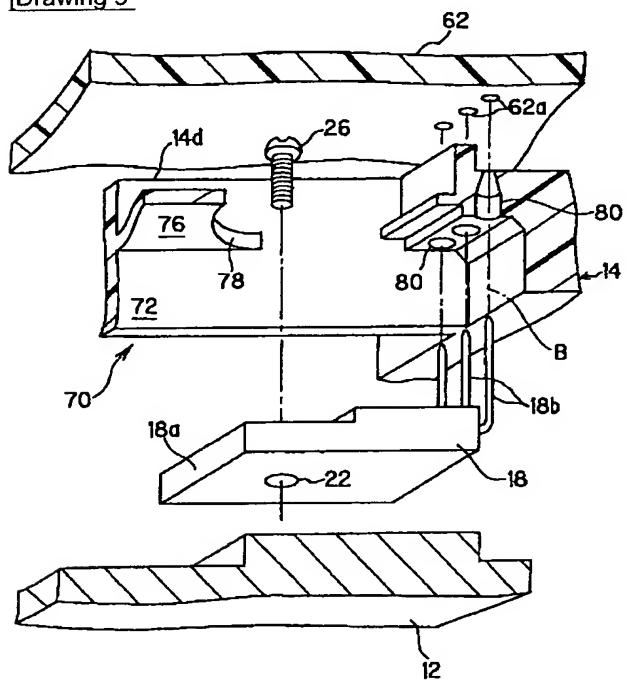
[Drawing 7]



[Drawing 8]



[Drawing 9]



[Translation done.]

【0012】図11はこの発明の一つの実施の形態に係る二輪車用封筒ユニット(以下「ユニット」という)1の構成を説明するための上面図、図12は図1のII-II'断面図である。封筒部を説明するための上面図、図13は図1のIII-III'断面図である。

(ボルト押通方向)の中間附近の適宜位置において予め図3に示すように横方向に抜け止め凹部34を設ける

と共に、縦方向（ボルト押送方向）に平目ローレット加工が施される。

【0021】 カラー3-2の外周面に抜け止め部輪3-4を形成したことにより、ボルトで締結した後にユニット1に振動が加えられた場合、あるいは開閉に温度変化が生じて各部材が膨張あるいは収縮した場合であっても、カラー3-2はケース本体1-4から抜け出ることがない。さらに、カラー3-2の外周面に平目ローレットを施したので、カラー3-2がケース本体1-4の内部で空転することもない。

【0022】尚、この実施の形態においては、カラー32の外周面に平目ローレット加工を施すと共に、抜け止め部34を形成したが、これ以外にも、例えば、カラーホルダ部32の外周面に継目ローレット加工などを施せば、カラー32の外周面に継目ローレット加工を形成することなく、カラー32がケーブル部34を形成するのを防止し、ケース本体14がケーブル部34を内空転するのを防止することができる。
【0023】図4は図2のカラー32の周辺の部分拡大

【0024】同図に示す如く、カラー-32はケース本体の下端14aおよび上端14bより、例えば0.1～1.4mm程度突出するように側指モールドされ、ケース-32の下端32aがベース12aに直接接続すると共に、上端32bがボルト98に直接接続するよう構成される。それにによって、ユニット10の組付け時に、風翼の部材のみで組接することができ、特にエンジンノ

ー内の部品部材の耐熱性(よみやうせいけい)強度を確保することができる。
【0025】また、ケース本体 1.4 の下端 1.4 a の周囲には、スクート状に形成された外壁部 1.4 c が設けられており、これによりケース本体 1.4 とベース 1.2 間の接着性を一層高めることができる。
【0026】さらに、ユニット 1.0 においては、ケース本体 1.4 とベース 1.2 の一方に凹部が設けられると共に

に、その他方に凹部に對応する位置において所定の間隔を有して凹部に挿入されるべき凸部が形成される、以下、図2を参照して、それらの構成について具体的に明する。

尚、ボルト溝孔28、31は、後述するボルトがそれらを通過できるように設えた位置に設置される。
【0020】図3はカラー3-2の断面図である。同図に示すように凹部30が設けられる。また、ベース12には、凹部30が設けられる。これに対応するよう金剛にわたって大リブ状に形成された凹部30が設けられる。凸部30は、カラー3-2が

—本体14の下端14aから突出した長さ、即ち0.2~0.5mm程度の間隙38を有しつつ凹部36に挿入される。

【0028】尚、ユニット10の組付け時に凸部30が凹部36に挿入されることによって凹部36に塗布(注入)された接着剤40は、下端14a方向(左右方向)

[0029] ユニット10の組付けの際、ケース本体に押し出される。

4とベース1.2の間に所定の間隙を設けて組み付ける際、凸部、接着剤4.0が間隙に十分に充填されず、防水性（一時性）や接着強度が損なわれることがある。

【0030】しかしながら、この実施の形態にあっては、ケース本体1.4にベース1.2を組付ける際、凸部4が所定の間隙3.8を有しつつ接着剤4.0が塗布されている凹部3.6に導入されるので、凹部3.6から押出し

された接着剤40は間隙3.8に延伸することができ、そして、防水性（シール性）を十分に充満される。洗って、接着面を拡大させること共に、接着面積を保することができる。尚、接着強度を向上させることができ。尚、接着剤40がベース1.2とカラー3.2が接触する位置に引張り、接着剤回部（後述）が剥離される。[0031] 尚、カラー3.2とベース1.2は、それら連通するように穿孔されたボルト通孔28、31を

[0033] ユニット10にあっては、さらに防水性
としてボルト98によって実績のされ、よってユニット
01は一体的に固定される。
[0032] 図6はケース本体14を下方から見た底
図であるが、同図に良く示すように、凹部36は前記
たな如くケース本体14の下端14aの全周にわたって
開けられる。また、図示を省略するが、ベース12には
それに対応するよう前に全周にわたって凸部30が設け
られる。

（0034）図7は図1のVII-VII線断面である。図1、図6および図7に示すように、ケース本体1.4は、コネクタ接続部50が一体的に脂膜モールド成形される。以下、図などを参照して、それらの構成について具体的に説明する。

れる。コネクタ接続部50は一端が開口されてコネクタ接続部52が形成されると共に、ユニット10に収容されるアリント基板(後述)とコネクタ(想像図で示す)54を接続するための端子56が、コネクタ接続部50の内方に突出するようにケース本体14と一体的に盛モールド成形される。

【0035】図8は図1に示すユニット10をコネク

接続口52の開口側から見た側面図である。図7および図8に示す如く、コネクタ接続口52には、ケース本体14の内部と外部、即ち、収容部側とコネクタ接続口

2割を連通させる換気孔58が形成される。
【0036】換気孔58は、より具体的には、ケース本体14において端子56が一体的に樹脂モールド成形され、

れた部位の下方にケース開口孔58aが形成されると共に、コネクタ接続孔52の最深部の壁面位置にコネクタ接続孔52が形成され、それらが連通されることで形

【0037】より具体的には、ユニット10内部の空気成される。

が封鎖した場合、換気孔5を通りユニット10内部の空気がコネクタ接続部50内に流入し、さらにコネクタ接続部50内に流入し、5に接続されるハネス(図示せず)内部を通り、車室(図示せず)内などの比較的環境の良い場所に逃げることができます。また、ユニット10内部の空気が吸縮した場合、車室内などの空気が膨張時の逆の経路をたどってユニット10に流入する。よって、周囲の温度変化化

著しい環境下においてユニット10がシール性の高い状態であっても、その影響を受けることがない。尚、熱交換部を介してケース本体14にカバー16を組み通して換気するときも、ユニット10内部より外部を遮断することができる。

[10038] 尚、コネクタ接続部50の壁面の遮断面には、コネクタ54を保持するための突起部60(図1、図6、図8に示す)が設けられ、コネクタ54側よりハンドル18を介してハンドル18を回転させることにより、コネクタ54を容易に外すことができる。

設けられ、適宜公認情報(添付表9)により、コネクタ54が接続部50に着脱可能に接続される。[0039]さらに、図1に示すようにケース本体1の上端14bは大脇平坦に形成されると共に、下端1a側の方には、パワートランジスタ18を収容可能なハウツトランジスタ収容部(後述)が形成される。

[0040]ユニット10の内部には、各種の電子部品が搭載されたプリント基板62が収容される。尚、アント基板62にはパワートランジスタ18のリード1

bが接続される。また、プリント基板6にコネクタ4を介してハーネス(図示せず)が隔離されて外部端子と信号の授受が行われる。それらの接続については、発明の要旨とは関係ないため説明を省略する。
【0041】以下、図9などを参照して、ユニット1の組付けについて説明する。図9はワートランジン1.8がケース本体1に収容される部分的な工程を説く。図11に示すユニット10を部分的に示す斜視図する。

ある。
【0042】先ザケース本体14にパワートランジスタ18が取付けられる。
【0043】ザケース本体14において、パワートランジスタ18が取付けられる位置には、それと略同大のパワートランジスタ取容部(凹状の取容部)70が4箇所形成される(1箇のみ図示)。

【0044】パワートランジスタ取容部70は、ゲート電極14の下方に向けて大略バスタブ状に形成される。本体1の壁面の一部である。

1.4の内部方向および外部方向、即ち図5における左右方向に押出しされて適当延伸し、間隙3.8に充填される。より詳しくは、ケース本体1.4とベース1.2の接着強度を確保するために必要な接着剤4.0の厚み、即ち間隙3.8をとるためにカラー3.2がケース本体1.4の下方から適宜の長さだけ突出するようにモールドされる。よって、間隙3.8に接着剤4.0が充填されて接着強度が向上される。

【0053】尚、図4に示す如く、ケース本体1.4内にモールドされたカラー3.2のモールドされた部分の下端周辺は突出され、接着剤回避部8.4が設けられる。接着剤回避部8.4は、接着剤4.0がカラーフラス3.2の下端3.2位置まで到達するのを効果的に防止する。

【0054】また、ベース1.2がケース本体1.4に組付けられる際、2箇所から突出したカラー3.2が支点となってベース1.2が部分的に上下動し、構造良く組付けてない恐れがある。そのため、図6に示す如く、ベース駆動部本体1.2の下端1.4aの適当位置に4個のベース駆動部電極などについて説明する。

一トランジスタ接触面7.6は、半円状の切り欠きと長方形の切り抜きとからなり、ケース本体1.4の上下を通過する連通部7.8を備え、ワートランジスタ1.8をベース1.2にボルト止めする際、ボルト2.6および図示しない工具（ドライバ）を通過させるのに用いられる。

【0045】また、ワートランジスタ接触面7.6の一部は段状に形成され、そこにハーフトランジスタ1.8のリード1.8bを挿入可能なリード捕獲部8.0がワートランジスタ接収部毎に3個設置される。ケース本体1.4には、プリント基板6.2を配置可能な基板固定部1.4d（図2、図7、図9に示す）が形成される。

【0046】尚、リード捕獲部8.0は、ワートランジスタ1.8の本体1.8aがワートランジスタ吸収部7.0に吸収されたとき、ワートランジスタ1.8から延長されるリード1.8bが伸縮される位置に設置される。

【0047】繰りて、ベース1.2、ケース本体1.4、ワートランジスタ1.8およびプリント基板6.2の相対位置について説明する。

【0048】ユニット1.0にあっては、少なくともバワートランジスタ(発熱部品)1.8が固定される(金属製)ベース1.2と、ベース1.2上に接着される(樹脂製)ケース本体1.4と、ケース本体1.4内部に収容され、バワートランジスタ1.8から延長されるリード1.8bが接着されるアーリント基板(基板)6.2とから構成され、ケース本体1.4にバワートランジスタ吸答部7.0が形成されてバワートランジスタ1.8が収容されると共に、バワートランジスタ吸答部7.0を形成する裏面(バワートランジスタ接触面)7.6にリード伸縮孔8.0が穿設され、リード伸縮孔8.0にリード1.8bが押道される。【0049】ベース載置部8.6は突出部8.6aおよび構部8.6bからなり、突出部8.6aは、高さ(具体的にはボルト押通孔28.3、1の伸縮方向長さ)において、カーラー32の下端32aがケース本体1.4の下端1.4aから突出した量(0.2~0.5mm)と程度だけ突出するようにならん。また、構部8.6bはカーラー32の下端間刃に設けられた接合部4.0と同様な形状に形成され、同様に接合部4.0が突出部8.6aの下方に到达するのを防止する。

【0050】尚、図6に示すように滑部8.6bは外壁部1.1に沿って走るスリット2.1を有する。また、接合部4.0は、構部8.6bの内側に位置する。

【0049】即ち、ユニット10において、ベース1と、ケース本体1.1およびアリント基板6.2は3層をして離脱される。より具体的には、ケース本体1.4を中心として、その上方にアリント基板6.2が配置され、その下方にパワートランジスタ1.8が固定されたベース1.2が配置されて3層状に組付けされる。尚、パワートランジスタ取答部7.0は凹状に形成されるので、ユニット1.0の高さが増加するなどの影響がない。

【0050】先ずケース本体1.4にワートランジスタ1.8が吸収され、次いでケース本体1.4の下端14.aの適宜位置、具体的にはケース本体1.4の四隅3.6内の全長にわたって接着剤4.0が硬化されることにより、ベース1.2とケース本体1.4との接着が完了される。

【0051】次いで、カラー3.2およびベース1.2との間に外壁部1.4.cに接するように設置された場所で、比較的大きな内面部が形成されてしまい、軸脂モールド成形を行うときに欠損(いわゆるショート)が生じ易くなるからである。

【0052】そこで、カラー3.2およびベース1.2との間にユニット1.0の反止め用のボルト押込孔2.8、3.1にユニット1.0の固定用のナット(図示せず)を用いてカラー3.2(即ち、ケース本体1.4)とベース1.2と共に接着剤4.0が押通され、ナット(図示せず)を用いてカラー3.2(即ち、ケース本体1.4)とベース1.2と共に接着剤4.0が硬化されることにより、ベース1.2とケース本体1.4との接着が完了される。

周にわりり接着剤40が塗布（注入）される。尚、接着剤を使用する。

【0051】次いで、ベース12の上にケース本体14（の下端14a）が組付けされる。具体的には、ベース12に設けられた凸部30が、ケース本体14に形成された凹部36に挿入されるよう嵌込まれる。

【0052】前記した通り、凹部36に塗布（注入）された接着剤40は、凸部30が挿入されるとケース本体

【0059】次いで、連通部78を介してボルト26がパワートランジスタ固定孔22ないしカット孔24（図8で図示省略）に挿入され、パワートランジスタ18がベース12にボルト止めされる。

【0060】ベース12がケース本体14に固定（ボルト止め）された後、プリント基板62がケース本体14の上端14b側に形成された開口から挿入される。挿入されたプリント基板62は、ケース本体14の内壁82

(図1および図2に示す)側の適宜箇所に複数回設けられた基板ガイド部8-8に沿って下降させると共に、上方から押圧されて押し込まれることにより、側面規則状に形成された基板固定手段9-0(図1および図2に示す)を押し広げながらクース本体1-4の基板固定部1-4に接触するまで下降させられる。アリント基板6-2が基板固定部1-4に接触すると、基板固定手段9-0は元の形状に戻り、よってアリント基板6-2が固定される。

[0061]ユニット1-0にあっては、さらに、アリン

ト基板6-2にリード押通孔8-0を押通する第2のリード押通孔6-2a(図9)を穿設し、第2のリード押通孔6-2aにリード18bを押通させるようにした。
【0062】より具体的には、基板6-2に穿設されたりード押通孔(第2のリード押通孔)6-2aは、パワートランジスター1-8の本体1-8aがパワートランジスター吸収部7-0に取容され、アリント基板6-2が基板固定部1-4d上に固定されたとき、リード18bがリード押通孔6-2aおよびリード押通孔8-0を押通する位置(図9に1

点頭鏡B(示す)に穿設される。
〔0063〕言い換れば、ケース本体14から突出したリード18bが、アント基板62に穿設されたりード溝通孔62aと共に搬通するように案内される。能立て、リード18bとリード溝通孔62aとの位置合わせが容易となる。
〔0064〕従来、リードを有する電子部品を搭載した基板を卯接するケース(ユニット)に組付けるとき、リードを基板に接続する際の位置合わせを行なうため、治具を用いたり、手作業で位置合わせを行なう必要があり、作業時間がかかる傾向にある。

【0065】この実施の形態にあっては、ケース本体4はワートランジスタ18の形状に倣った形状のワートランジストラップ部70を備え、そこにワートランジスタ本体18aを収容するとき、リード18bがリード押通孔80に押通されるように構成される。これにより、ワートランジスタ18をワートランジストラップ部70に収容するだけでリード18bの位置合わせが手軽するので、ユニット10を組付ける際の作業効率を上げることができる。

【0066】次いで、リード18bヒアリント基板6とが半田付けなどの処理によって接続され、上方からワ

バー16(図2および図6に示す)が取締される。バー16の端部開縫16aは、同図に示す如く、垂下するように形成されており、垂下した部分はケース本体14の上端14bの全周にわたって形成されたカバー取容部94に吸容される。

【0067】次いで、吸容された端部開縫16aとカバー94の残余の部分(間隙)にシリコン系接着剤96が塗布(注入)されると共に、カバー16が上方から図示しないウェイトなどで押圧され、その周辺が加熱

されることにより、接觸部96が硬直化される。
【0068】組付けされたユニット10は取扱い用のボルトおよびナットが取り外され、固定ボルト98を介して車両のエンジンルーム内の適当な箇所、例えばルーム壁面あるいはエンジンの吸気管などに直接またはステーを介し、金属部材からなるユニット部置部100(図4に示す)に一枚側に固定されると共に、コネクタ54が接続される。尚、以上の工程で、予めワートランジスター18をベース12にボルト止めしてからベース12

一ド押通孔に前記リードを押通させるように構成した。
 [0072]また、さらに、前記基板に、前記リード押通孔に連通する第2のリード押通孔62aを設置し、前記第2のリード押通孔に前記リードを押通させないように構成した。

[0073]尚、上記した実施の形態において、ユニット10内に収容される発熱性部品、即ちハーフトランジスタ18およびハーフトランジスタ取容部70の個数をそれ4個としたが、それに限られるものではなく、他の適宜な個数にしても良い。

〔0074〕また、ベース12をアルミニウムからなる金屬材としだが、放熱性の高いものであれば、他の金属材を選択しても良い。

[0075]また、ケース本体14がカラー32と接触する外周面に横方向に凹部を設けると共に、平目ローレット加工を施すが、カラー32の形状は、ケース本体14から離落せず、ケース本体14内で空転することがなければ、どのような形状であっても良い。

[0076]また、凸部30がベース12側に、凹部36がケース本体14側に形成されるようにしたが、凸部30がケース本体14側に、凹部36がベース12側に形成されるように構成しても良い。

[0077]また、ユニット10の組付ける際、パワー

トランジスタ18を収容した後にケース本体14へ接着剤を塗布したが、先に接着剤を塗布しても良い。

〔0078〕

〔発明の効果〕請求項1項においては、発熱部品が固定される(ヒートシンクとして機能する)金属性ベース上に接着されるケース本体に、発熱部品を収容可能な凹状の取容部を形成して取容すると共に、この凹状の取容部を形成する壁面上にリード押通孔を穿設、より具体的には、凹状の取容部に電子部品が取容されたとき、電子部品から延長されるリードが押通する位置にリード押通孔が設置されるように構成したので、発熱性の電子部品のリードを上向きに固定して搭載するプリント基板を収容する場合であっても、放熱性を確保しつつ、リードの位置合わせを容易にすることができる、組付け作業性を向上させることができる。また、凹状の取容部を設けたの

で、ユニットの高さが増加するなどの影響がない。

[0079]また、請求項2項においては、基板にリード押通孔に連通する第2のリード押通孔を穿設し、その第2のリード押通孔にリードを押通させる、より具体的には、凹状の取容部に電子部品が取容されたとき、リードが押通する位置にリード押通孔および第2のリード押通孔が設置されるように構成したので、ユニットを組付けるとき、リードの位置合わせを一層容易とできることができる、一層組付け作業の効率を向上させることができるものである。

〔図面の簡単な説明〕

〔図1〕この発明の一つの実施の形態に係る車両用制御ユニットの構造を説明するための上面図である。

〔図2〕図1のII-II線断面図である。

〔図3〕図1に示すカラー32の放大断面図である。

〔図4〕図2に示すカラー32周辺の部分放大断面図である。

〔図5〕図2に示すA-Aで示す部分拡大断面図である。

〔図6〕図1に示すケース本体14の底面図である。

〔図7〕図1のVII-VII線断面図である。

〔図8〕図1に示すユニット10をコネクタ接続部52(開口)側から見た断面図である。

〔図9〕パワートランジスタ18がケース本体14に取容される部分的な工程を説明する、図1に示すユニット10を部分的に示す斜視図である。

〔符号の説明〕

1.0 車両用制御ユニット(ユニット)

1.2 金属ベース(ベース)

1.4 凹指貫ケース本体(ケース本体)

1.6 カバー

1.8 パワートランジスタ(発熱部品)

1.8 b リード

6.2 プリント基板(基板)

6.2 a 第2のリード押通孔

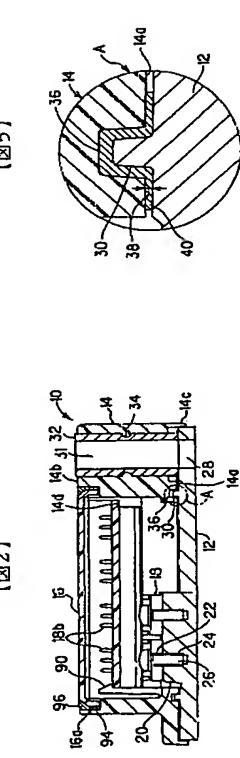
7.0 パワートランジスタ取容部

7.6 パワートランジスタ接觸面

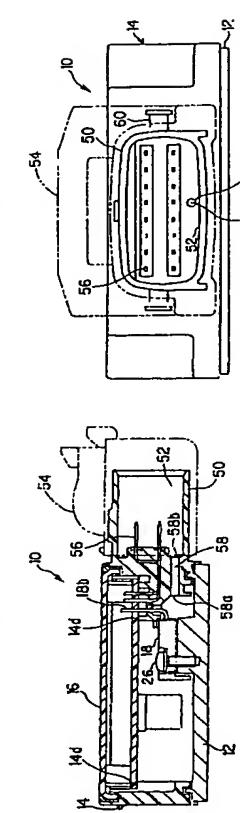
8.0 リード押通孔

1.00 ユニット載置部

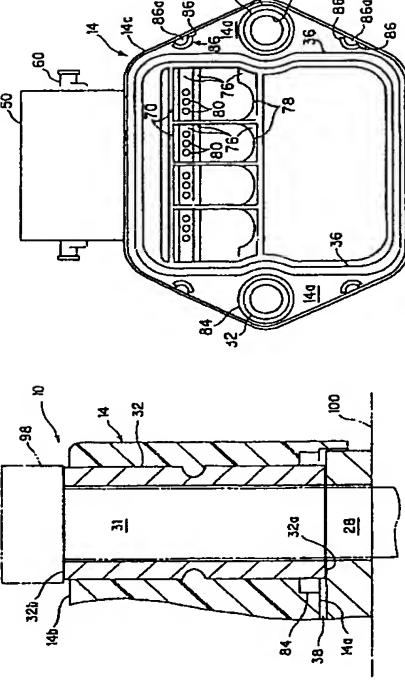
〔図2〕



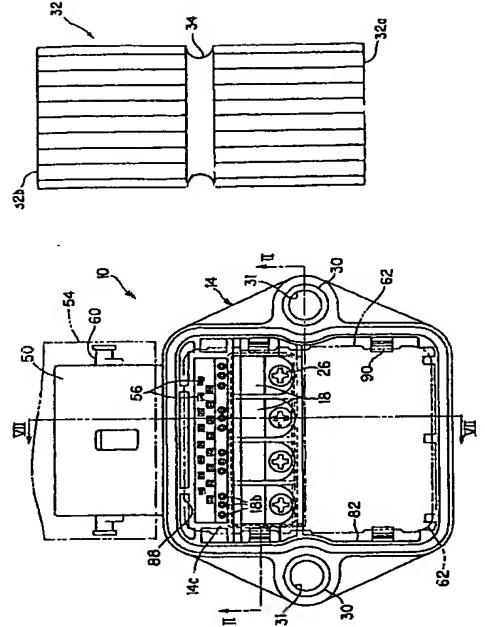
〔図5〕



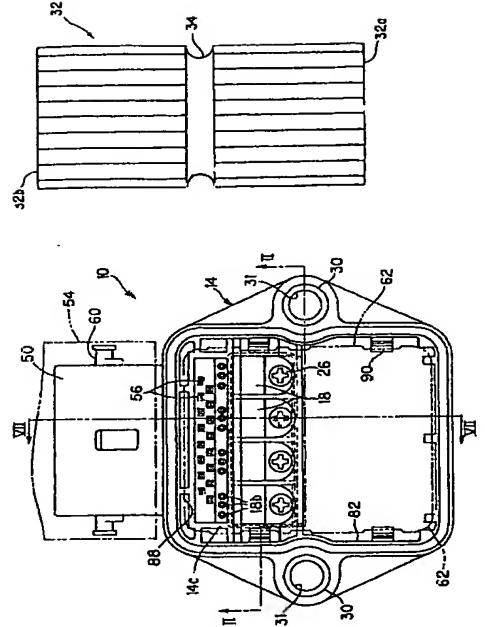
〔図6〕



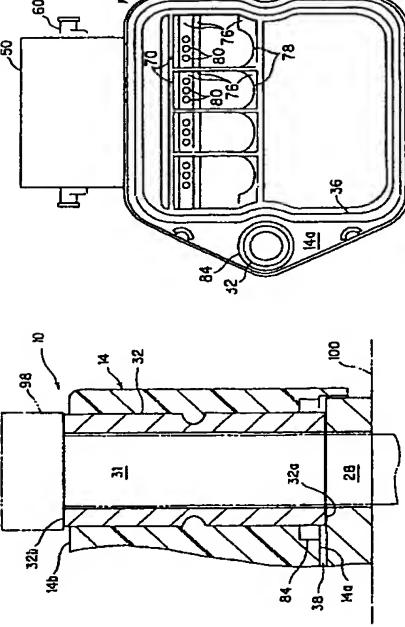
〔図3〕



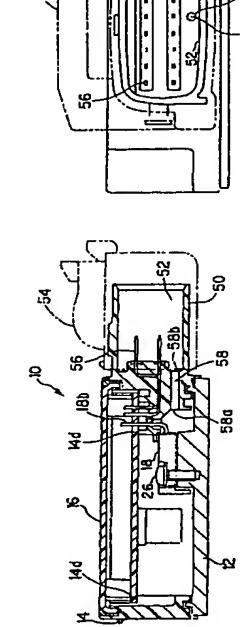
〔図1〕



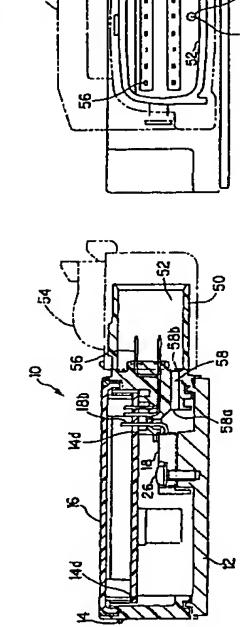
〔図4〕



〔図7〕



〔図8〕



[図9]

